CLAIMS

We claim:

1. A motor for driving a cylindrical roller that rotates around a stationary shaft, the motor being characterized by:

a cylindrical rotor disposed inside of and mounted to rotate with said cylindrical roller around said stationary shaft;

wherein said rotor is formed of a plurality of longitudinal segments of permanent magnetic material, wherein said segments alternate orientation of north-south magnetic polarity in a radial direction to produce flux in flux path loops connecting pairs of the longitudinal segments; and

a plurality of stator coils mounted on said shaft for receiving current from an external power supply that commutates current in said stator coils; and

further characterized in that said motor is a brushless d.c. motor; and

further characterized by means supported by the stator shaft for sensing position of the rotor with respect to said stator shaft.

2. The motor of claim 1, further characterized by:

a cylindrical metal housing which forms a part of the rotor for receiving the segments of permanent magnetic material and for supporting the shaft and the stator coils in a motor assembly; and

further characterized in that said motor assembly is disposed inside of and secured to said roller.

3. The motor of claim 2, further characterized in that said motor assembly is secured to said roller at least in part by a force fit of the cylindrical metal housing inside said roller.

4. The motor of claim 1, 2 or 3, further characterized in that said rotor and said plurality of stator coils extend part way in an elongated direction of said roller.

Sub A' cancel

5. The motor of claim 1, 2 or 3, further characterized in that said rotor and said plurality of stator coils extend substantially an entire length of said roller.

6. The motor of claim 1 or 2, further characterized in that said plurality of poles includes at least six poles formed in said cylindrical member as longitudinal segments with segments of alternating north-south magnetic polarity with said roller providing a magnetic path between segments.

7. The motor of claim 1, 2 or 3, further characterized in that said rotor is connected to directly drive said roller without the use of a reduction gear assembly.

8. The motor of claim 1 or 2, further characterized in that the stator coils are formed of a sufficient number of turns of a sufficiently narrow guage wire to produce a ratio of stator voltage to speed of at least 10 RMS volts per 1000 RPM for an applied stator voltage of 24 RMS volts per phase.

9. The motor of claim 8, wherein the stator has a plurality of teeth, and further characterized in that each stator coil encircles a single stator tooth.

10. The motor of claim 1 or 2, further characterized in that the sensor means is a sensor for detecting a rotational position of the rotor.

add A2

add B1